WHAT IS CLAIMED IS:

1. A machine spindle comprising:

a casing defining a center axis; and

a clamping device disposed in the casing for clamping a tool, the clamping device comprising:

front and rear drawbars arranged substantially coaxially in the casing, the front drawbar having a clamp at its front end for gripping a tool in response to rear movement of the front drawbar, the clamp disposed within the casing, the rear drawbar being axially movable relative to the front drawbar;

a spring for biasing the rear drawbar rearwardly; and

a wedge assembly for transmitting rearward movement of the rear drawbar to the front drawbar for rearwardly moving the front drawbar, the wedge assembly comprising a plurality of sets of wedges spaced circumferentially apart, each set including a radially inner wedge and a radially outer wedge arranged in sliding contact with one another, the inner wedge arranged to be displaced rearwardly by the rear drawbar for displacing the outer wedge generally radially outwardly, wherein the inner and outer wedges include respective parallel planar surfaces arranged in surface contact for cooperative sliding engagement with one another and oriented at an oblique angle with respect to the axis.

2. The machine spindle according to claim 1 wherein the respective parallel planar surfaces comprise a first pair of parallel planar cooperative surfaces arranged for cooperative sliding engagement with one another during one stage of rearward movement of the rear drawbar, and a second pair of parallel planar cooperative surfaces arranged for cooperative sliding engagement with one another during a subsequent stage of rearward movement of the rear drawbar, wherein a first angle formed between the first pair of cooperative surfaces and the axis is different from a second angle formed between the second pair of cooperative surfaces and the axis.

3. The machine spindle according to claim 2 wherein the first angle is greater than the second angle.

4. The machine spindle according to claim 3 further including an anvil having an anvil surface oriented obliquely relative to the axis and arranged to displace the outer wedge rearwardly against the front drawbar in response to the generally radially outward movement of the outer wedge, wherein a radially outward force applied from the inner wedge to the outer wedge is greater when the second pair of cooperative surfaces are in engagement than when the first pair of cooperative surfaces are in engagement, for amplifying a rear force applied to the front drawbar during the subsequent stage of rearward movement of the rear drawbar.

5. The machine spindle according to claim 2 wherein at least some of the cooperative surfaces are provided with an anti-friction coating.

6. The machine spindle according to claim 4 wherein the surfaces of the inner wedge that comprise the first and second pairs of cooperative surfaces form an obtuse angel with one another, and the surfaces of the outer wedge that comprise the first and second pairs of cooperative surfaces form an obtuse angle between one another.

7. The machine spindle according to claim 4 wherein the rear drawbar includes a plurality of circumferentially spaced radially outwardly open countersinks in which respective wedge pairs are partially disposed.

8. The machine spindle according to claim 7 wherein each countersink includes a bulge received in a notch formed in the respective inner wedge to restrain the inner wedge against axial movement relative to the rear drawbar.

9. The machine spindle according to claim 7 wherein the front drawbar includes a plurality of circumferentially spaced, radially inwardly open grooves aligned generally radially with respective countersinks of the rear drawbar and in which respective wedge pairs are partially disposed.

10. The machine spindle according to claim 9 wherein a portion of each groove widens circumferentially, the respective outer wedge widening in complementary fashion to the groove, wherein the outer wedge is constrained against axial movement relative to the front drawbar.

11. The machine spindle according to claim 1 wherein the rear drawbar includes a plurality of circumferentially spaced radially outwardly open countersinks in which respective wedge pairs are partially disposed.

12. The machine spindle according to claim 4 wherein the front drawbar includes a plurality of circumferentially spaced, radially inwardly open grooves aligned generally radially with respective countersinks of the rear drawbar and in which respective wedge pairs are partially disposed.

13. The machine spindle according to claim 1, the front drawbar includes a plurality of circumferentially spaced, radially inwardly open grooves aligned generally radially with respective countersinks of the rear drawbar and in which respective wedge pairs are partially disposed.

14. A force-amplifier drawbar assembly comprising:

front and rear drawbars arranged substantially coaxially, the front drawbar including a clamp at its front end for gripping a tool in response to rear movement of the front drawbar, the rear drawbar being axially movable relative to the front drawbar, and

a wedge assembly for transmitting rearward movement of the rear drawbar to the front drawbar for rearwardly moving the front drawbar, the wedge assembly comprising a plurality of sets of wedges spaced circumferentially apart, each set including a radially inner wedge and a radially outer wedge arranged in sliding contact with one another, the inner wedge arranged to be displaced rearwardly by the rear drawbar for displacing the outer wedge generally radially outwardly, wherein the inner and outer wedges include respective parallel planar surfaces arranged in surface contact for cooperative sliding engagement with one another and oriented at an oblique angle with respect to the axis.

15. The drawbar assembly according to claim 14 wherein the respective parallel planar surfaces comprise a first pair of parallel planar cooperative surfaces arranged for cooperative sliding engagement with one another during one stage of rearward movement of the rear drawbar, and a second pair of parallel planar cooperative surfaces arranged for cooperative sliding engagement with one another during a subsequent stage of rearward movement of the rear drawbar, wherein a first angle formed between the first pair of cooperative surfaces and the axis is different from a second angle formed between the second pair of cooperative surfaces and the axis; wherein the first angle is greater than the second angle.

16. The drawbar assembly according to claim 14 further including an anvil having an anvil surface oriented obliquely relative to the axis and arranged to displace the outer wedge rearwardly against the front drawbar in response to the generally radially outward movement of the outer wedge, wherein a radially outward force applied from the inner wedge to the outer wedge is greater when the second pair of cooperative surfaces are in engagement than when the first pair of cooperative surfaces are in engagement, for amplifying a rear force applied to the front drawbar during the subsequent stage of rearward movement of the rear drawbar.

17. The drawbar assembly according to claim 16 wherein at least some of the cooperative surfaces are provided with an anti-friction coating.

18. The drawbar assembly according to claim 16 wherein the rear drawbar includes a plurality of circumferentially spaced radially outwardly open countersinks in which respective wedge pairs are partially disposed.

19. The drawbar assembly according to claim 18 wherein each countersink includes a bulge received in a notch formed in the respective inner wedge to restrain the inner wedge against axial movement relative to the rear drawbar.

20. The drawbar assembly according to claim 18 wherein the front drawbar includes a plurality of circumferentially spaced, radially inwardly open grooves generally radially aligned with the countersinks of the rear drawbar and in which respective wedge pairs are partially disposed.

21. The drawbar assembly according to claim 20 wherein a portion of each groove widens circumferentially, the respective outer wedge widening in complementary fashion to the groove, wherein the outer wedge is constrained against axial movement relative to the front drawbar.

22. The drawbar assembly according to claim 14, further including a spring for biasing the rear drawbar rearwardly.